UNITED STATES MARINE CORPS FIELD ARTILERY FIRE CONTROLMANS COURSE

MANUAL PRECISION REGISTRATION

Objective: To conduct a Precision Registration and to determine Total corrections and a GFT Setting.

PRECISION REGISTRATIO

A technique for determining, by adjustment, firing data that will place the Mean Point of Impact (MPI) of a group of rounds on a point of known location , which can be designated as a registration or known point.

CHART TO ADJUSTED DATA:

Corrections, determined by comparing the data that actually did hit the target (ADJUSTED DATA) to the data that should of hit the target (CHART DATA) if standard conditions had existed at the time of firing.

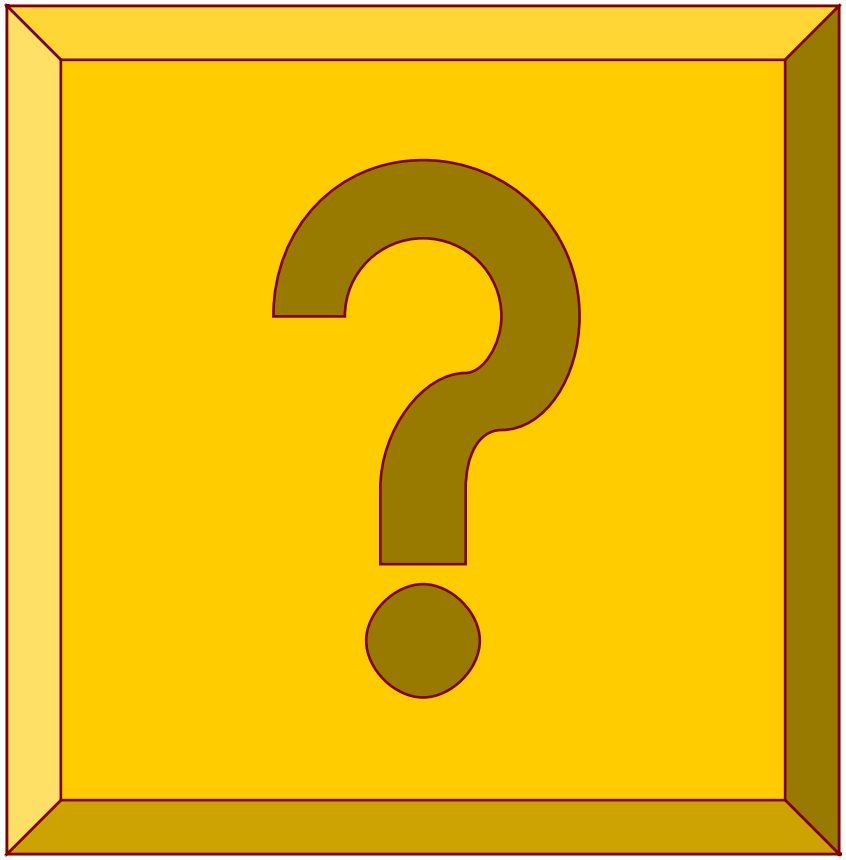
ADVANTAGES/DISADVANTAGES

ADVANTAGE:

Corrects for the cumulative effects of all non-standard conditions by firing vice measuring.

DISADVANTAGE:

Exposes the firing unit to enemy target acquisition devices and causes no damage to the enemy. When possible integrate into other missions, especially when observer is equipped with a laser.



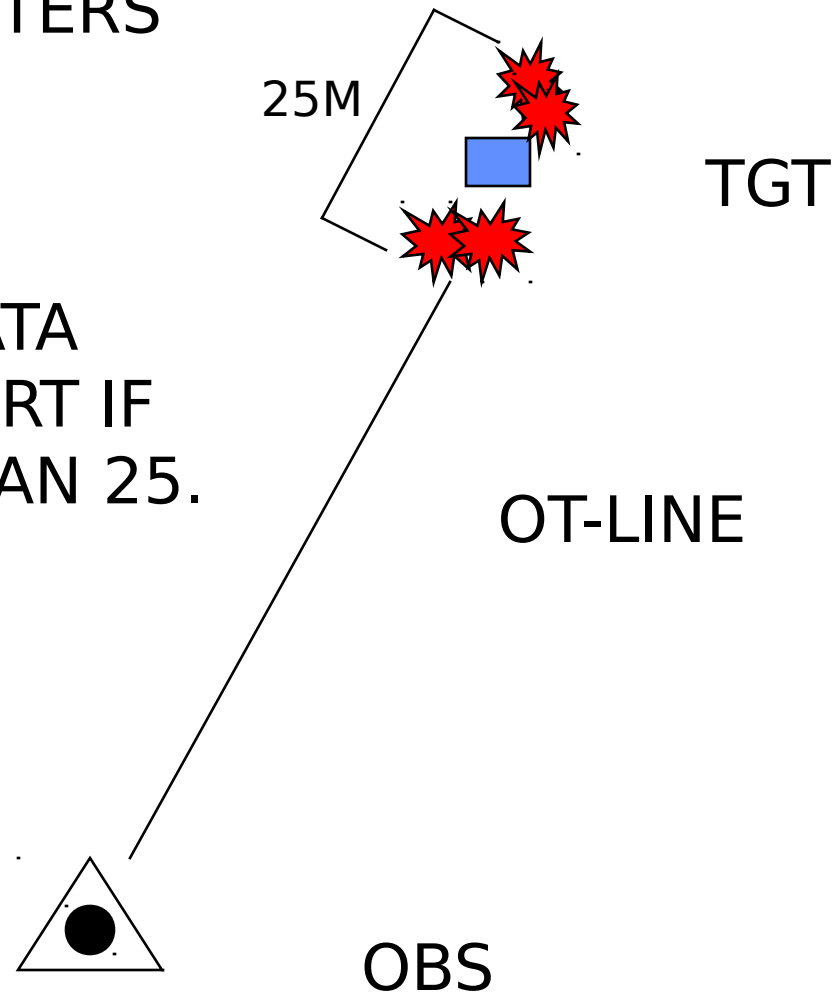
OBJECTIVE OF IMPACT PHASE:

Is to establish spotting of two overs and two shorts along the Observer-Target (OT) line from rounds fired with the same data or from rounds fired with data 25 meters apart or 50 meters apart when probable error in range (PEr) is greater than or equal to 25 meters.

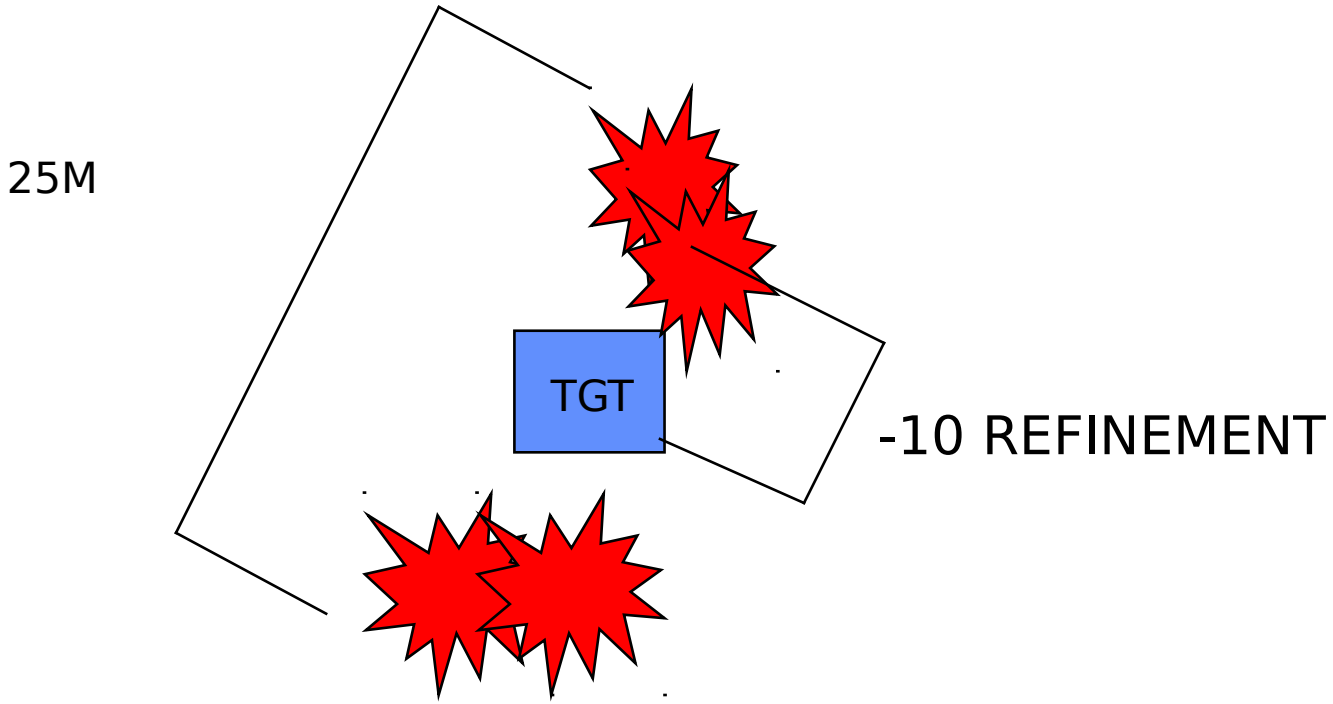
IMPACT PHASE SPOTTINGS (OBJECTIVE)

4 RDS/SAME DATA
OR WITHIN 25 METERS
APART.

OR 4 RDS/SAME DATA
OR 50 METERS APART IF
PEr IS GREATER THAN 25.



IMPACT PHASE SPOTTINGS (OBJECTIVE)

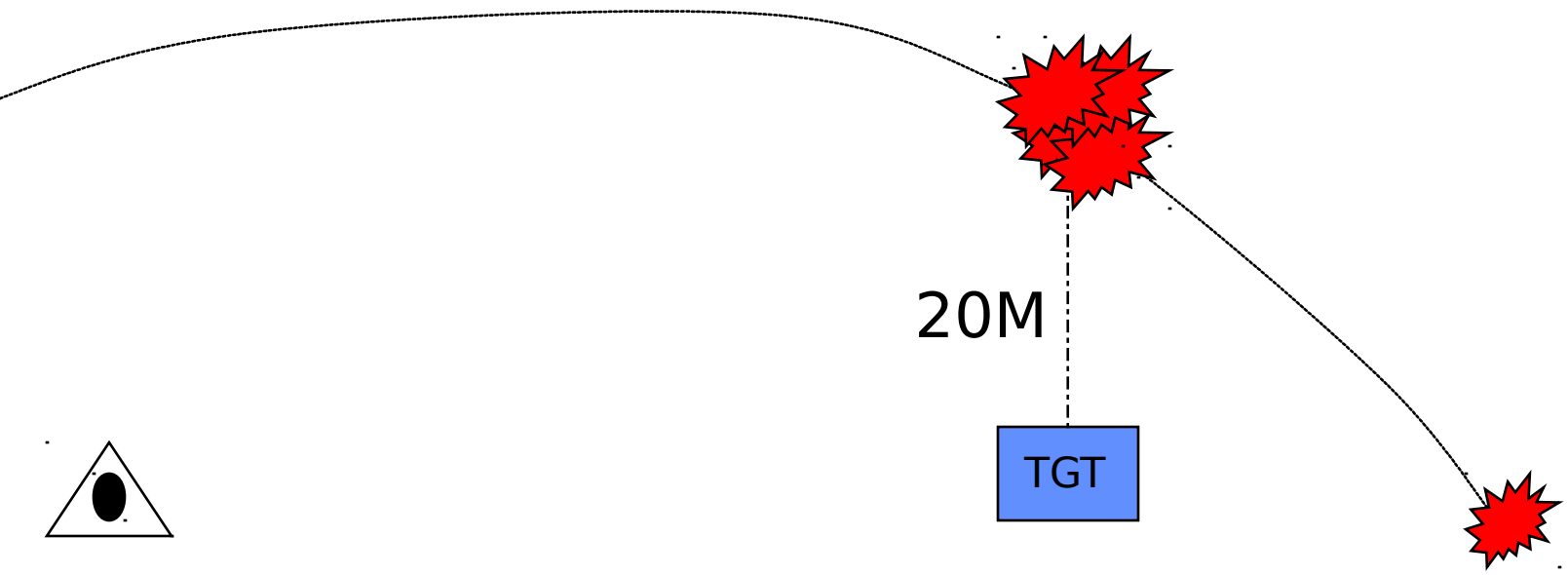


THE OBS SENDS A REFINEMENT CORRECTION THAT WOULD PLACE THE LAST RD ON TGT (NOT FIRED) THIS IS APPLIED BY THE FDC TO DETERMINE AJUSTED OR DID HIT DATA.

OBJECTIVE OF TIME PHASE:

IS TO CORRECT THE MEAN HEIGHT OF BURST OF 4 ROUNDS WITH THE SAME DATA TO 20 METERS ABOVE THE TARGET POINT.

OBS MAY CORRECT TO ACHIEVE HOB OF 20M, AND SEND REFINEMENT CORRECTION FOR HOB AS WELL.

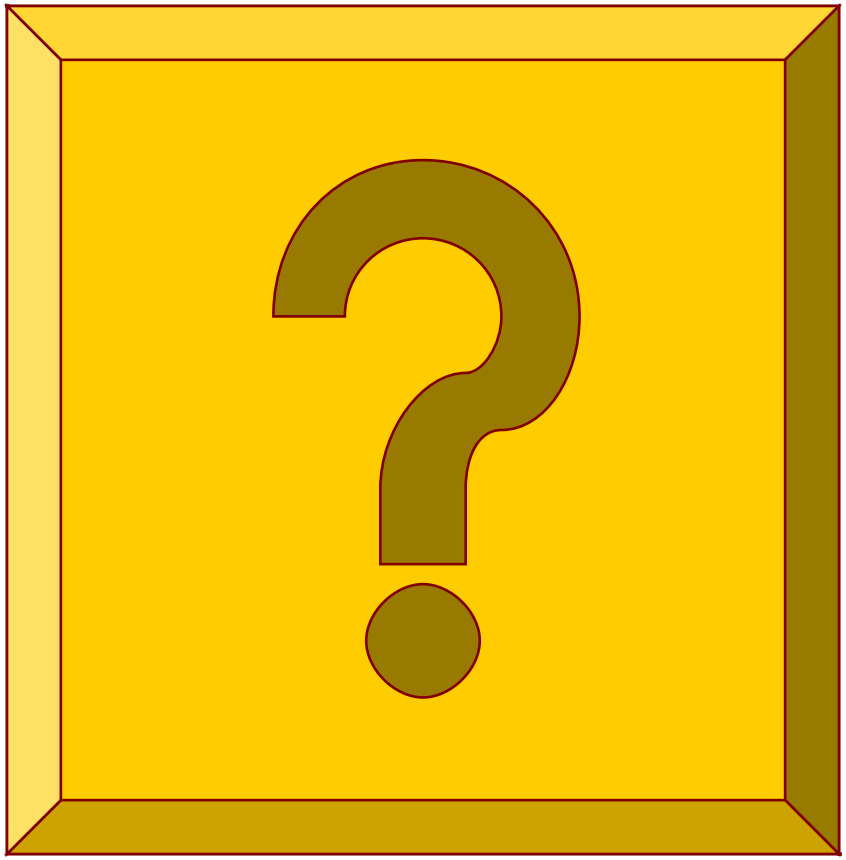


FIRE DIRECTION CENTERS OBJECTIVE

Is to determine a GFT setting and Total Corrections,

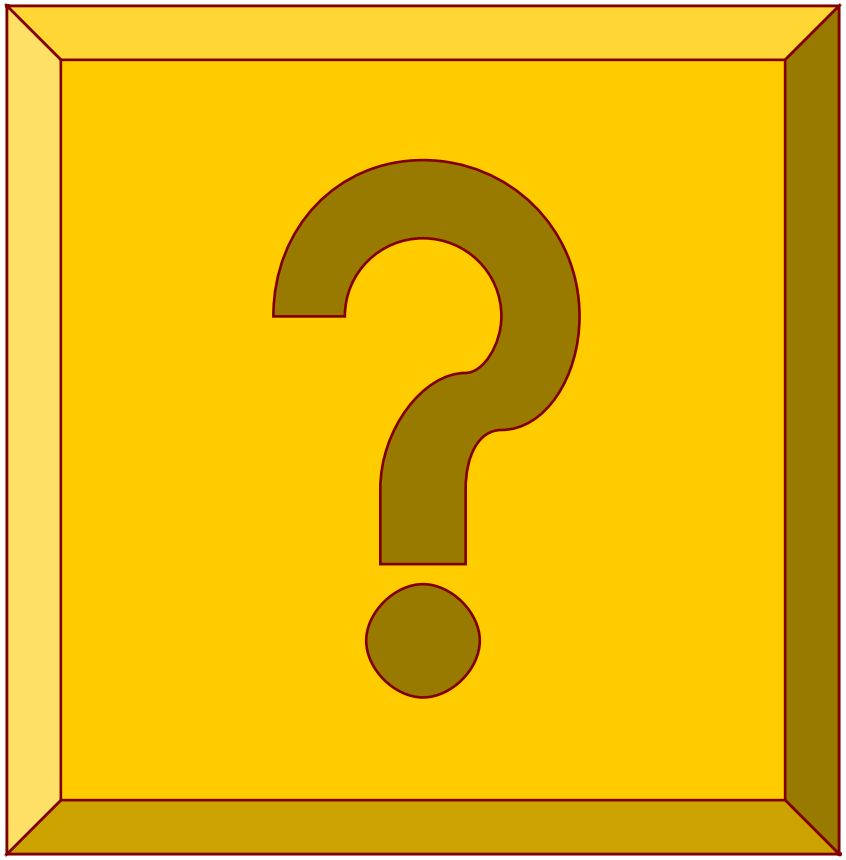
Total Range
Total Fuze
Total Deflection

With the GFT setting properly applied, it is possible to Fire For Effect on accurately located targets without adjustment.



FOUR VITAL MESSAGES

- CALL FOR FIRE(CFF): A REQUEST FROM THE OBSERVER FOR FIRES TO THE FDC
- FIRE ORDER: AN ORDER FROM THE FDO TO THE FDC
- MESSAGE TO OBSERVER(MTO): AN ORDER FROM THE FDC TO THE OBSERVER
- FIRE COMMANDS: AN ORDER FROM THE FDC TO THE GUNS



RECORD OF FIRE (ROF)

THE ROF IS THE OFFICAL DOCUMENT THAT THE FOUR VITAL MESSAGES ARE RECORDED ON.

THE COMPUTER IS RESPONSIBLE FOR RECORDING ANY DATA HE DETERMINES, OR RECEIVES.

MUST BE KEPT NEAT AND LEGIBLE, LEGAL DOCUMENT.

SEPERATED INTO SEVEN BLOCKS;

1. THE CALL FOR FIRE BLOCK.

THE FIRST VITAL MESSAGE IS RECORDED HERE.

THE REQUEST FROM THE OBSERVER FOR FIRES ON A TARGET ARE RECORDED IN THIS BLOCK.

CALL FOR FIRE

Observer _____ AF/FFE/IS/S _____ Tgt _____

Grid: _____

Polar: Dir _____ Dis _____ U/D _____ VA _____ + - _____

Shift _____ :Dir _____ L/R _____ +/- _____ U/D _____

_____

2. THE FIRE ORDER BLOCK.

THE SECOND OF THE FOUR VITAL MESSAGES IS RECORDED HERE.

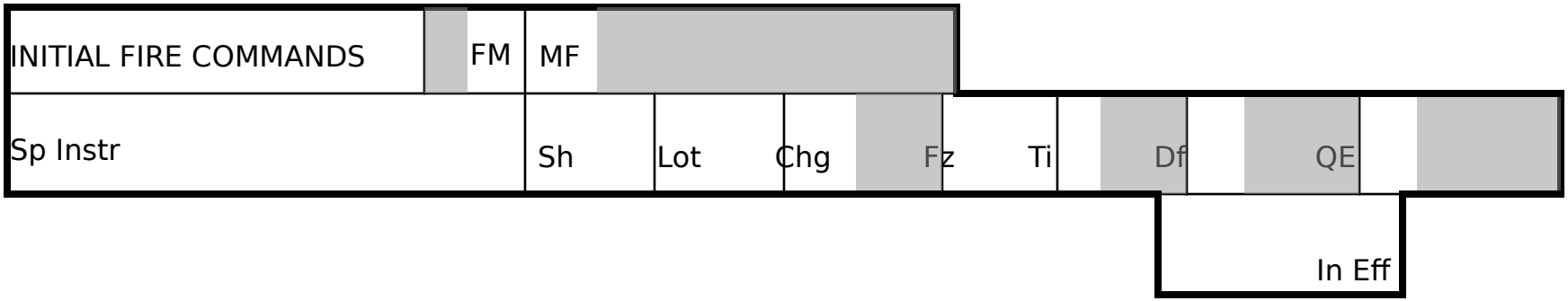
AN ORDER FROM THE FDO TO THE FDC HOW, WHEN AND WHERE HE WANTS TO ATTACK THE TARGET

FIRE ORDER

3. INITIAL FIRE COMMANDS AND ADDITIONAL INFORMATION BLOCKS.

FIRE COMMANDS PROVIDE THE LINK BETWEEN THE FDC AND THE GUNLINE.

ALL INFORMATION TO ALLOW THE GUNS TO LOAD AND FIRE THE ROUND ARE CONTAINED IN THE FIRE COMMANDS BLOCKS.



ADDITIONAL INFORMATION BLOCKS

THE COMPUTER RECORDS ADDITIONAL INFORMATION AND WILL DO HIS COMPUTATIONS IN THIS AREA.

(MATH COMPUTATION AREA)		△ FS
		100/R
		/R
		20/R
Si 10	10 m Si	HOB Corr
	Df Corr	Si
Rg	Cht Df	El
		[redacted]
		Ammo Exp

4. THE MESSAGE TO OBSERVER BLOCK

CONTAINS INFORMATION FROM THE FIRE ORDER THAT PERTAINS TO THE OBSERVER; EXP: TYPE OF REG, THE KNOWN POINT, AND FUZES TO BE REGISTERED. THEN THE MTO IS
TRANSMITTED FROM THE FDC TO THE OBS TO INFORM HIM OF THE FDO'S DECISION TO ATTACK THE TARGET.

MUST BE TRANSMITTED IN A TIMELY FASHION.

MTO	4 T	PE R	TF

5. OBSERVERS SUBSEQUENT FIRE CORRECTIONS

THE SUBSEQUENT CORRECTIONS SENT BY THE OBS TO MOVE THE IMPACT OF THE PROJECTILE TO THE TARGET ARE RECORDED IN THIS BLOCK

Tgt	Location	Prioity	Firing Unit
Dir, MF Sh, Fz	Dev	Rg	HOB Corr

6. SUBSEQUENT FIRE COMMAND BLOCK

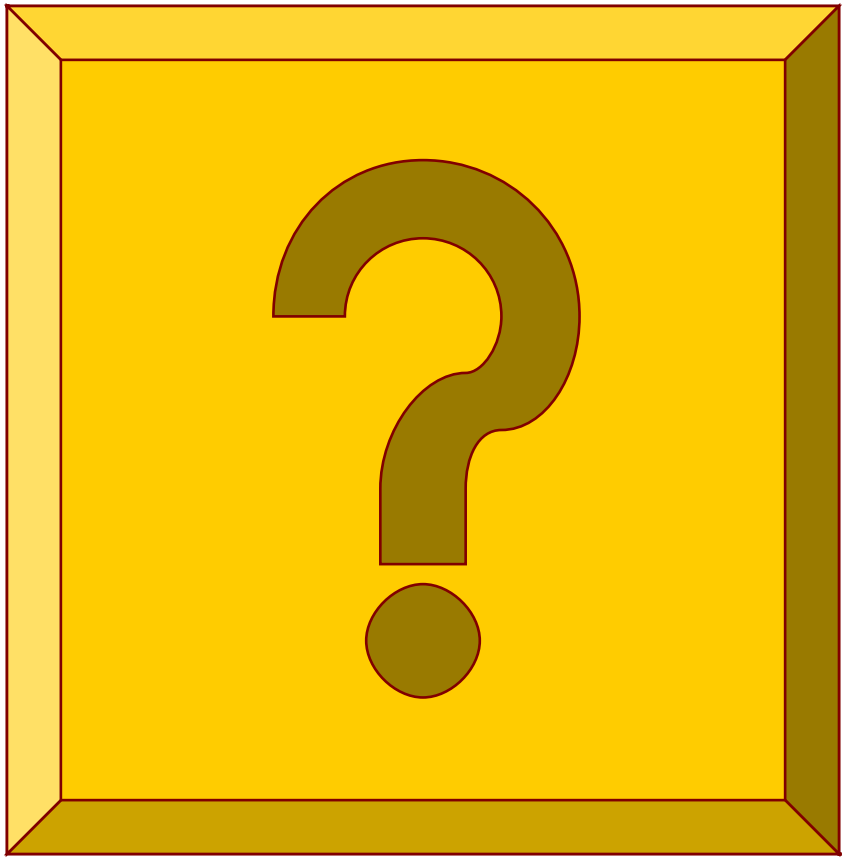
JUST AS THE COMPUTER RECORDED AND DETERMINED INITIAL FIRING DATA, THE COMPUTER WILL RECORD CHART DATA FROM THE HCO FOR SUBSEQUENT CORRECTIONS IN THE SUBSEQUENT FIRE COMMANDS BLOCK.

SUBSEQUENT FIRE COMMANDS											AMMO	
MF, Sh Chg, Fz	FS Corr	Ti	Chart Df	Df Corr ( )	Df Fired	Chart Rg	HOB Corr	Si ( )	El	QE	Exp	Type

7. COMPUTATION AND ADMINISTRATIVE BLOCKS

THESE BLOCKS ARE USED FOR COMPUTATIONAL REQUIREMENTS AND TO RECORD THE ADMINISTRATIVE DATA FOR EACH ROF.

(MATH COMPUTATION AREA)				
Btry	DTG	Tgt	Replot Grid	Replot Alt



FIRE ORDER

- THE CALL FOR FIRE NORMALLY INITIATES FIRE MISSIONS, BUT NOT THE PRECISION REGISTRATION. THE DECISION TO REGISTER IS MADE BY THE FDO OR OPS CHIEF, NOT THE OBSERVER.

- ONCE THE DECISION IS MADE TO REGISTER, THE ORDER IS ISSUED TO THE FDC IN A SET FORMAT CONTAINING ALL NECESSARY INSTRUCTIONS TO ATTACK THE TARGET. (FIRE ORDER)

- IN ADDITION TO THE REGULAR FIRE ORDER ELEMENTS, OUR FIRE ORDER MUST INCLUDE THE FOLLOWING INFORMATION.

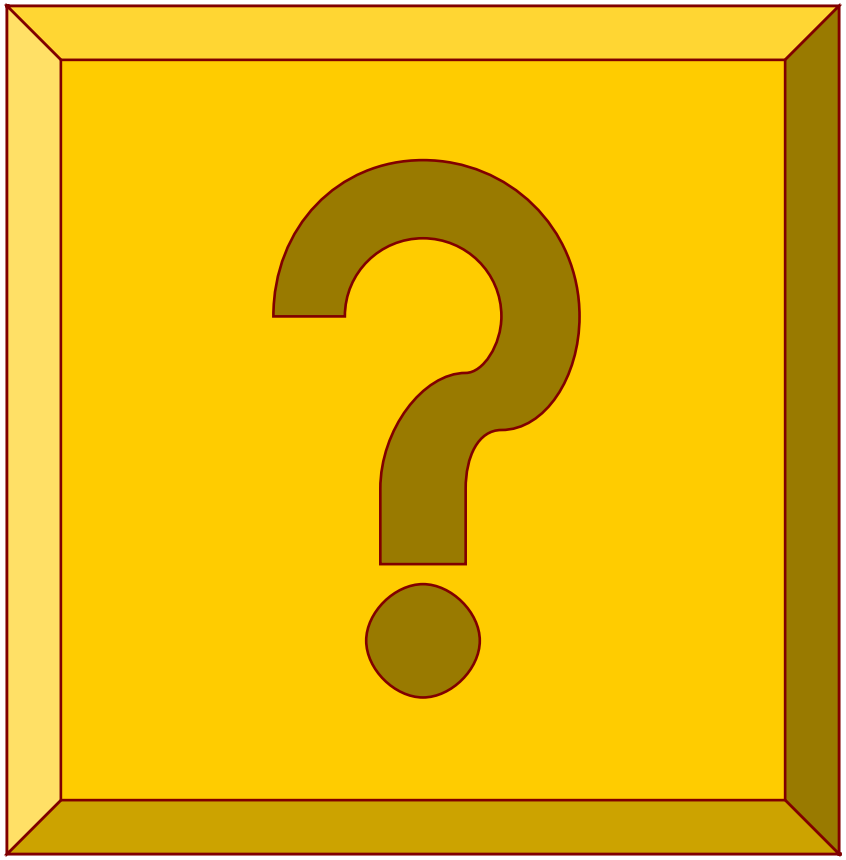
FIRE ORDER ELEMENTS

1. WHAT
2. WHERE
3. WHO
4. UNIT TO FIRE
5. ADJUSTING ELEMENT/METHOD OF FIRE OF THE ADJUSTING ELEMENT
    - PROJECTILE IN ADJUSTMENT
    - LOT & CHARGE IN ADJUSTMENT
    - FUZE IN ADJUSTMENT
6. BASIS FOR CORRECTIONS
7. DISTRIBUTION
8. SPECIAL INSTRUCTIONS
9. METHOD OF FIRE FOR EFFECT
10. PROJECTILE IN EFFECT
11. AMMO LOT & CHARGE IN EFFECT
12. FUZE IN EFFECT
13. TARGET NUMBER

PE BOOK PAGE 5

PE #1

WHAT	PREC REG
WHERE	ON KNOWN PT 01
WHO	W/OBS H26
UNIT TO FIRE	
ADJUSTING ELEMENT MOF IN ADJ PROJ IN ADJ LOT & CHG IN ADJ FUZE IN ADJ	# 3 1 HE A/G 4 Q & TI
BASIS FOR CORRECTION	GFT
DISTRIBUTION	
SPEC INSTRUCTIONS	AMC
PROJ i/e	
LOT & CHG i/e	
FUZE i/e	
TGT NUMBER	



MESSAGE TO OBSERVER (MTO)

THE MTO IS TRANSMITTED FROM THE FDC TO THE OBS TO INFORM HIM OF THE DECISION TO REGISTER. IT CONTAINS INFORMATION OF WHAT TO EXPECT AND HOW TO CONDUCT THE MISSION.

ELEMENTS OF THE MTO

1. WHAT (TYPE OF REG)
2. WHERE (LOCATION)
3. FUZES (QUICK OR QUICK AND TIME)
4. TARGET NUMBER (IF ASSIGNED)

ADDITIONAL INFORMATION

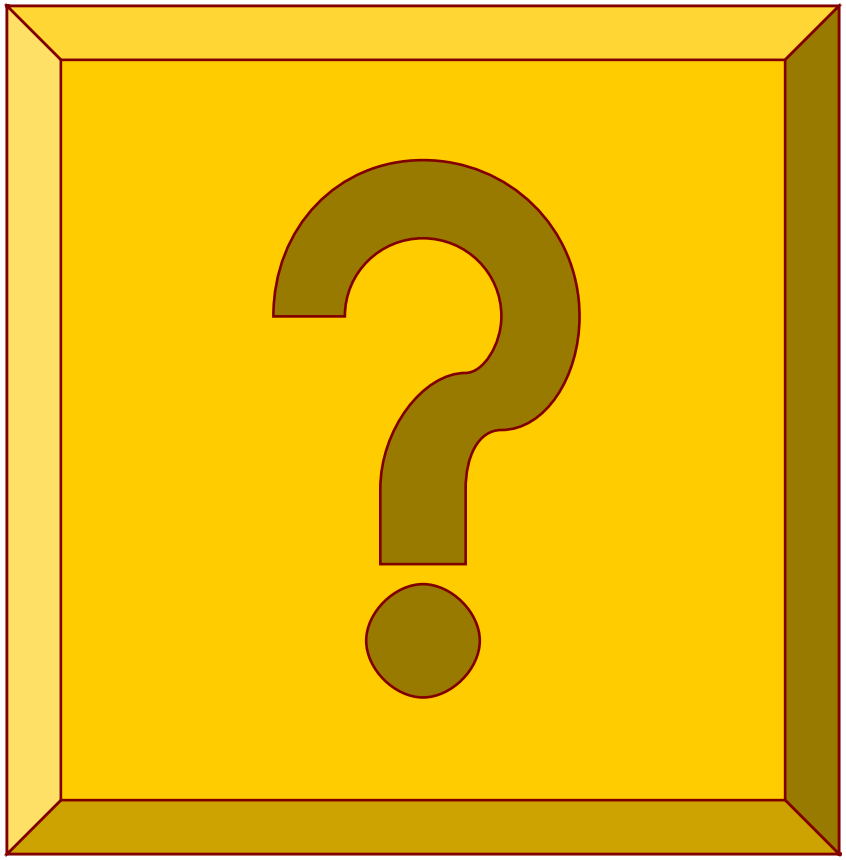
A. ANGLE T (ONLY IF GREATER THAN 500 MILS)
B. PE RANGE (ONLY IF GREATER THAN 25 METERS)
C. TIME OF FLIGHT (ONLY IF REQUESTED)

PE BOOK PAGE 5, 8.

MTO

PE # 1

WHAT	OBS PREC REG
WHERE	ON KNOWN PT 01
FUZES	Q & TI
TARGET NUMBER	
ADDITIONAL INFORMATION	
ANGLE T	
PER	
TOF	



FIRE COMMANDS

AS THE FIRE ORDER IS SEQUENCED FOR EASE OF PROCESSING IN THE FDC, THE FIRE COMMANDS ARE ORDERED TO ASSIST THE GUN SECTION IN IT’S OPERATION.

FIRE COMMANDS FALL INTO TWO CATEGORIES:

INITIAL FIRE COMMANDS

SUBSEQUENT FIRE COMMANDS

FIRE COMMANDS CONTAIN 11 ELEMENTS

PE BOOK PAGE 6

PE # 1

ELEMENT	
WARNING ORDER	FIRE MISSION
PIECES TO FOLLOW/ ELEMENT TO FIRE/ METHOD OF FIRE OF THE ELEMENT TO FIRE	 # 3 1
SPECIAL INSTRUCTIONS	AMC
PROJECTILE	HE
AMMUNITION LOT	A/G
CHARGE	4
FUZE	Q
FUZE SETTING	
DEFLECTION	
QUADRANT	
METHOD OF FIRE IN EFFECT	TI

PRACTICAL EXERCISE

PE # 1

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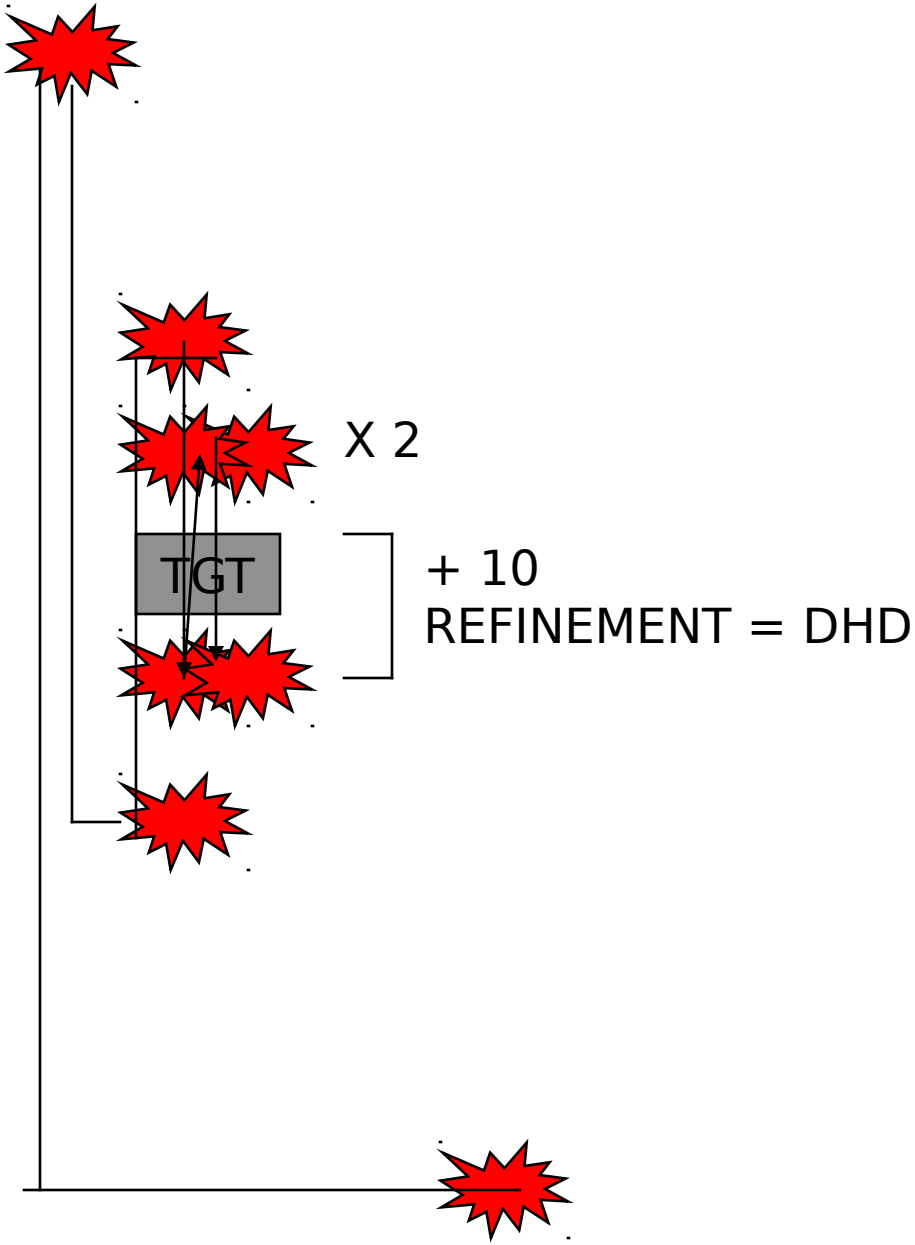
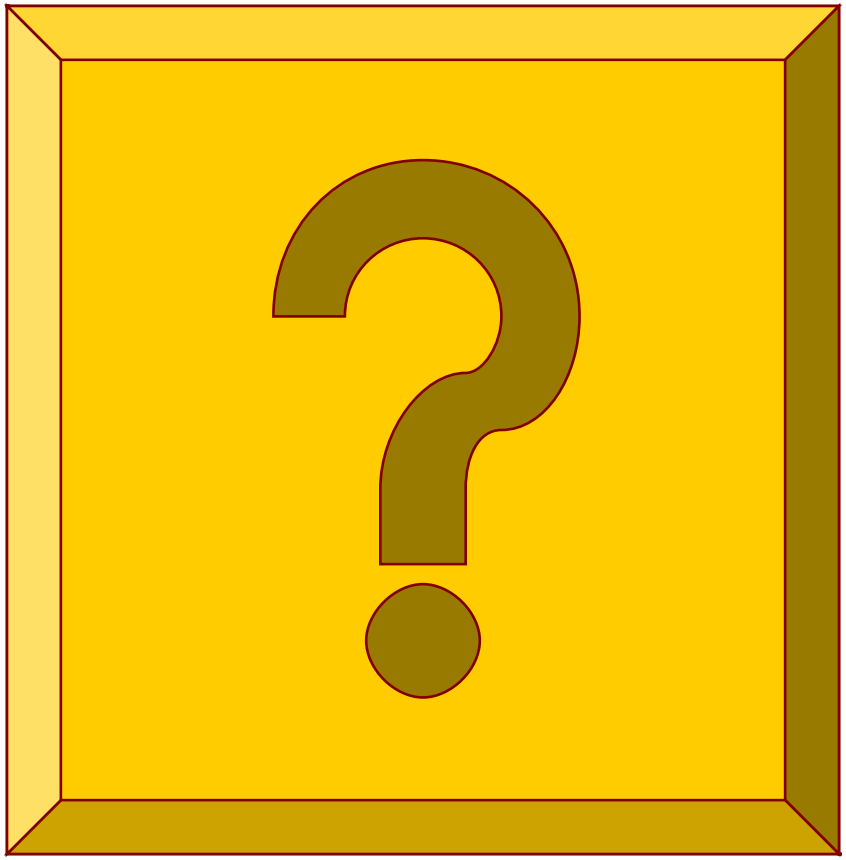

X 2
TGT
+ 10
REFINEMENT = DHD



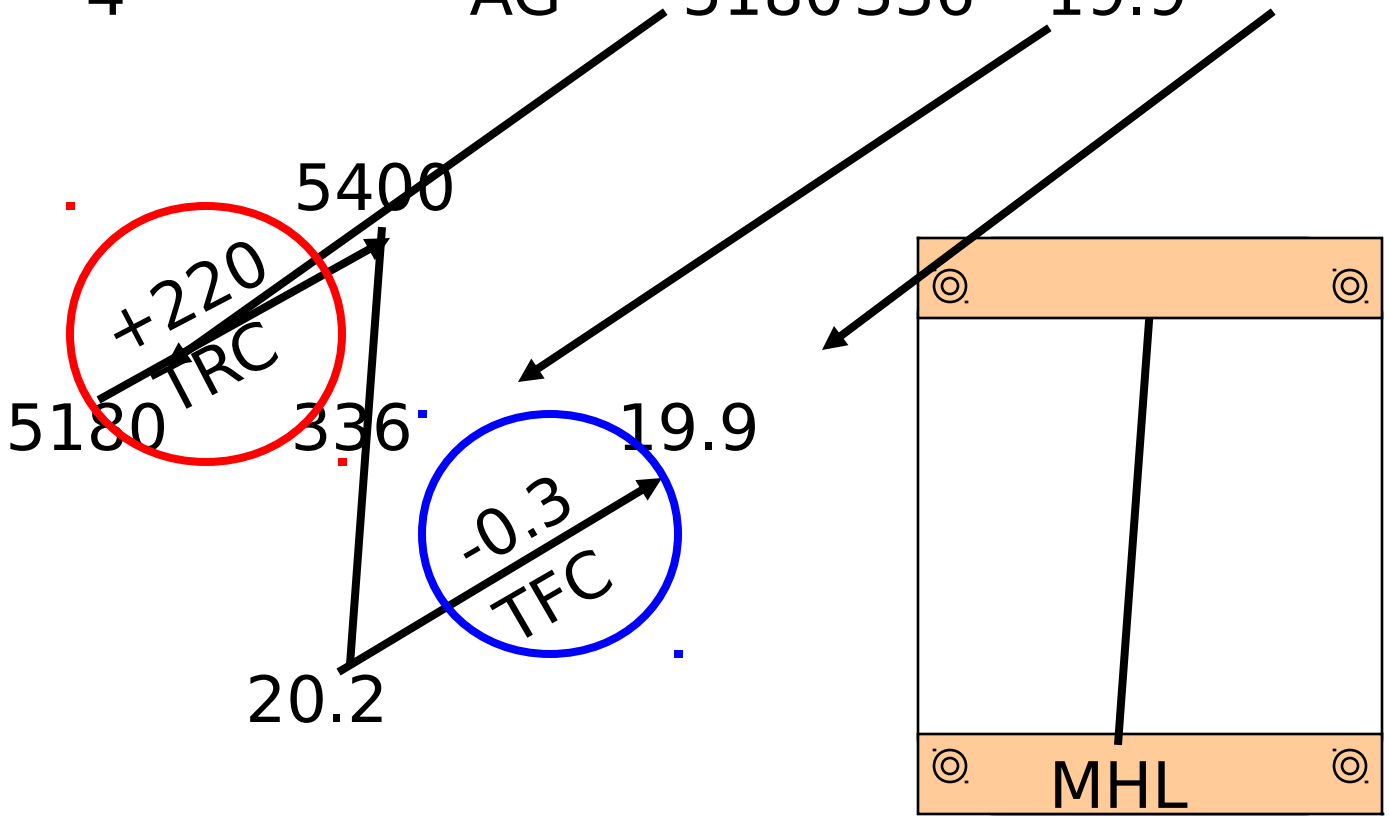
GFT setting

U- unit
C- charge
A- ammunition lot
R- range
E- elevation
T- time

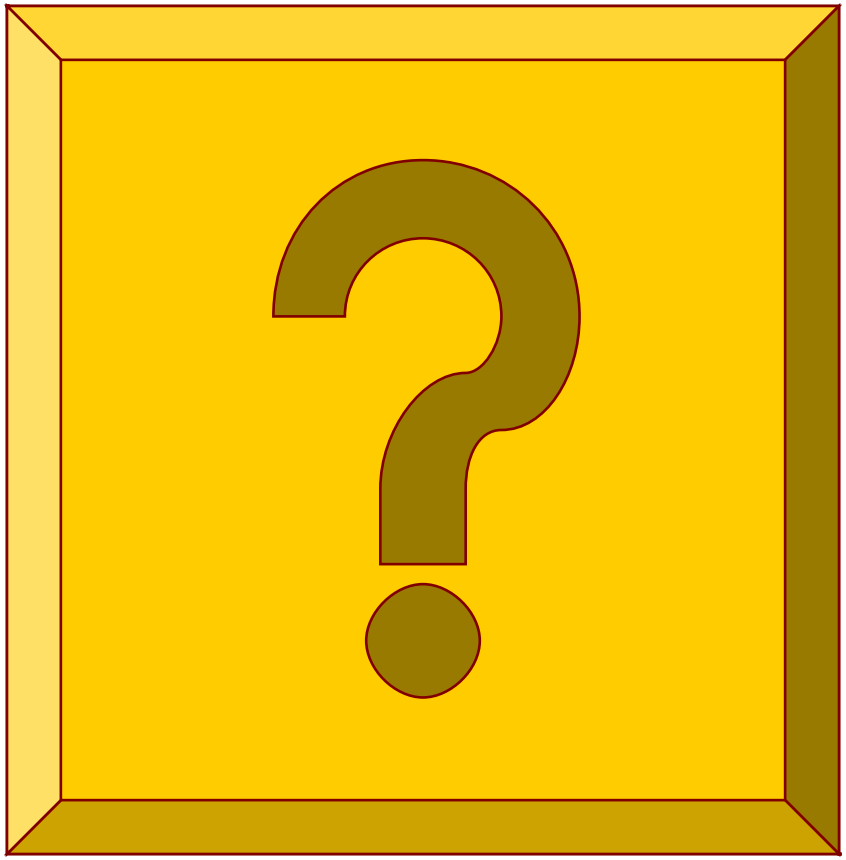
UNIT	CHARGE	AMMO LOT	RANGE	ELE	TIME
B	4	AG	5180 336	19.9	

GFT SETTING

UNIT	CHARGE	AMMO LOT	RANGE	ELE	TIME
B	4	AG	5180 336	19.9	



DEFLECTION CORR

TRC=	+220
TFC=	-0.3
TOT DFC	L11
GFT DFC	L4

DHD DF	3244
SHD DF	3233
TOT DFC	L11
- DFT @ DHD EL	(L)R 7
GFT DFC	L4